



<b>CLASS: VIII</b>	<b>DEPARTMENT: SCIENCE 2022 - 23</b>	<b>DATE: 13.10.2022</b>
<b>WORKSHEET NO.: 9 WITH ANSWERS</b>	<b>TOPIC: MATERIALS: METALS AND NON-METALS</b>	<b>NOTE: A4 FILE FORMAT</b>
<b>NAME OF THE STUDENT:</b>	<b>CLASS &amp; SEC:</b>	<b>ROLL NO.</b>

**I. VERY SHORT ANSWER (1M)**

1. Define-
  - a) Malleability (**Hint: property by which metals can be beaten into thin sheets** )
  - b) Ductility (**Hint : property by which metals can be drawn into wires**)
2. Element A is soft, brittle and does not conduct electricity .Element B is hard ,malleable and ductile and also conduct electricity Which of the two elements A or B is a non-metal?  
( **Hint: Element A .Non-metals are elements which are soft, brittle and does not conduct electricity**)
3. Mention any four examples of metals and non-metals.(**Hint: Metals- Iron, Copper, Calcium, Gold Non-metals- Oxygen, Sulphur, Chlorine, Nitrogen**)
4. Why cooking utensils are made of metals but their handles are made of wood/plastic?  
(**Hint: Metals are good conductors of heat but wood/plastic are poor conductors of heat**)
5. How will you detect the evolution of hydrogen gas in reaction between a metal and acid?  
(**Hint: Bring a burning matchstick near the mouth of the test tube hydrogen burns with a pop sound**)
6. List the uses of some metals.  
(**Hint: Gold/ silver is used to make jewellery, Copper /Aluminium is used to make cooking utensils ,Mercury is used in thermometers**)
7. List the uses of some non-metals.  
(**Hint: Chlorine is used for water purification, Nitrogen used in fertilisers to enhance the growth of plants ,Iodine is applied on wounds as an antiseptic** )
8. Name the following-
  - a) Property of metals which makes them useful as electric wires-(**Hint: Ductility, Good conductor of electricity** )
  - b) Non – metal which has metallic lustre-(**Hint: Iodine**)
  - c) A non- metal which conducts electricity or heat- (**Hint: Graphite**)
  - d) Metals which are soft and can be cut with a knife-(**Hint: Sodium and potassium**)
  - e) A metal which is found in liquid state at room temperature-(**Hint: Mercury**)
  - f) A non-metal which is the hardest substance known. (**Hint: Diamond, a form of carbon**)

9. An element forms an oxide which is acidic in nature. Is the element a metal or a non-metal?

**(Hint: Non-metal. Non-metals form acidic oxides)**

10. Can you hold a hot metallic pan which is without a plastic or a wooden handle? Give reason

**(Hint: We cannot hold a hot metallic pan which is without a plastic or a wooden handle because metals are good conductors of heat)**

*For the question numbers 11, 12 and 13, two statements are given - one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below*

*i) Both A and R are true and R is the correct explanation of the assertion.*

*ii) Both A and R are true but R is not the correct explanation of the assertion.*

*iii) A is true but R is false.*

*iv) A is false but R is true*

11. Assertion (A): Metals are sonorous.

Reason (R): They are generally brittle in solid state, they break into pieces when hammered.

**(iii) A is true but R is false.**

12. Assertion (A): A statue made up of copper acquired a dull green coating on it after a couple of months.

Reason (R): Copper does not react with dilute hydrochloric acid even on heating.

**(ii) Both A and R are true but R is not the correct explanation of the assertion.**

13. Assertion (A): Non-metal chlorine is used in water purification process.

Reason (R): Chlorine has the power to kill germs.

**(i) Both A and R are true and R is the correct explanation of the assertion.**

## **II. PASSAGE BASED QUESTIONS:**

**Read the passage carefully and answer the following questions.**

Metals are lustrous whereas non-metals have dull appearance. Metals like sodium and potassium are soft and can be cut with a knife. Generally, metals are malleable and ductile. Non-metals do not have these properties. Generally, metals are good conductors of heat and electricity but non-metals are poor conductors. On burning, metals react with oxygen to produce metal oxides which are basic in nature. Non-metals react with oxygen to produce non-metallic oxides which are acidic in nature. Some metals react with water to produce metal hydroxides and hydrogen gas. Generally, non-metals do not react with water. Metals react with acids and produce metal salts and hydrogen gas. Generally, non-metals do not react with acids. Some metals react with bases to produce hydrogen gas. More reactive metals displace less reactive metals from their compounds in aqueous solutions. Metals and non-metals are used widely in everyday life.

1. Some metals react with bases to produce gas:

i) Oxygen

ii) Nitrogen

**iii) Hydrogen**

iv) Carbon dioxide

2. Which of the following property is not responsible for copper to be used as electrical conduction wires?

- i) ductility      **b) colour**      c) good conductor of electricity      d) it is solid

3. Solution of a metal oxide-

- i) turns blue litmus red      **ii) turns red litmus blue**  
iii) shows no colour change with blue litmus      iv) none of these

4. Which of these physical properties do non-metals exhibit?

- i) ductility      ii) malleability      iii) sonorous      **iv) none of these**

### **III. CASE STUDY-BASED QUESTIONS:**

1. Kanika takes a burning substance and collected the evolved vapours in a test tube, making sure, that they do not escape. A small amount of water is added to the test tube. To the solution obtained, a few drops of blue litmus solution are added. The litmus solution turns red.

(i) Which of the following could be the burning substance?

- (a) Magnesium **(b) Sulphur** (c) Sodium (d) Iron

(ii) Why blue litmus solution turned red in the above activity ?

**[Hint: Non-metallic oxides are acidic in nature and hence it turns blue litmus red.]**

(iii) Explain what happens when Sulphur burned in air ?

**[Hint :When Sulphur burned in air it combines with oxygen and form Sulphur dioxide gas .When Sulphur dioxide gas dissolved in water it form sulphurous acid which turns blue litmus red.]**

2. One day Reetha went to a jeweller's shop with her mother .Her mother gave an old gold jewellery to goldsmith to polish. Next, day when they brought jewellery back they found that there was a slight loss in its weight.

(i) The least reactive metal among the following is :

- (a) Sodium (b)lead **(c) Silver** (d) Calcium

(ii) Can you suggest a reason for the loss in their jewellery weight ?

**[Hint: while polishing old gold jewellery a thin outer dull layer of gold is removed by treatment with a chemical .This leads to a slight loss in the weight of jewellery]**

### **IV. a) SHORT ANSWER TYPE QUESTIONS (2M):**

1. Give reasons:-

a) Copper is used for making electric wires. **(Hint: Ductile ,good conductor of electricity)**

b) Metals like sodium are stored in kerosene but not in water.

**(Hint: react vigorously with oxygen and water )**

c) Some non-metals like phosphorus are stored in water.

**(Hint: catches fire if exposed to air hence phosphorus is stored in water to prevent the contact with atmospheric oxygen)**

d) We shouldn't store mango pickle and lemon in metal containers.

**(Hint: Acid present in them react with metal containers and produce poisonous substances )**

e) Silver is used to make sweet decorating foil. **(Hint: Malleable)**

2. Metal oxides are basic in nature. Explain with an example.  
(Hint: Metals react with oxygen to form metal oxide .Metal oxides dissolved in water form respective metal hydroxides which can turn red litmus blue Eg Magnesium combines with oxygen to form magnesium oxide ,magnesium oxide dissolve in water to form magnesium hydroxide when we dip a red litmus it turns blue confirms that metal oxides are basic in nature)
3. Raj is using a simple electric circuit to test the flow of electric current through different types of materials. What will he observe with following materials? Give reason for it.
  - a) Iron nail –(Hint: Iron being a metal allow electric current to pass through it)
  - b) Coal- (Hint: Is a form of carbon which is a non-metal that does not allow electric current to pass through it)
4. There are two boxes, one made of metal and other made of wood, which are similar in appearance. How will you find the box made of metal? (Hint: Metals are sonorous in nature whereas wood is non-sonorous)
5. Complete the following reactions:-
  - a) Silver + copper sulphate → No reaction
  - b) Iron + oxygen + water → Hydrated iron oxide (rust)
  - c) Sulphur dioxide + water → Sulphurous acid
  - d) Aluminium + hydrochloric acid → Aluminium chloride + Hydrogen
  - e) Iron + sulphuric acid → Iron sulphate + Hydrogen
6. Why are bells made of metals?  
(Hint: Metals produce loud sound when struck by an object /metals are sonorous)
7. Drop a piece of aluminium in freshly prepared solution of sodium hydroxide taken in a test tube. A pop sound is heard when a lighted matchstick is brought near the test tube. Write down your conclusion and the reason for the pop sound. (Hint: metal react with a base to produce hydrogen gas. Hydrogen gas burns with a pop sound.)

#### **IV. b) SHORT ANSWER TYPE QUESTIONS (3 M):**

1. What happens when zinc granules are put in copper sulphate solution and left undisturbed for some time, explain the observations and write the word equation involved. What type of reaction is this? Define the reaction.  
(Hint: Zinc being more reactive than copper displace copper from copper sulphate and form Zinc sulphate and Copper. We find that the blue colour of the solution disappears and a powdery red mass is deposited at the bottom of the beaker.  
**Displacement Reaction- A reaction in which more reactive element (metal) displaces a less reactive element (metal) from its salt solution.**)
2. A boy burnt Sulphur powder and collected the gas in a gas jar. Then he poured water into the jar and a milky solution was formed as the gas was dissolved in water.
  - a) Name the gas which is formed in the reaction. (Hint: Sulphur dioxide)
  - b) What is the product formed when water is mixed with the gas? (Hint: sulphurous acid)

- c) Will the solution turn red litmus blue? Why? (**Hint: No because Non-metallic oxides are acidic in nature it turns blue litmus red and no change with red litmus**)
3. Arjun took few samples of metals and non-metals in separate test tubes A, B, C, D, E and F. He added 5 ml of dilute hydrochloric acid to all the test tubes. If no reaction takes place in the cold solution, warm the test tube gently. He repeated the same activity with dilute sulphuric acid. Complete the following table-

Test Tube Label	Metal/ Non-metal	Reaction with Dilute Hydrochloric Acid		Reaction with Dilute Sulphuric Acid	
		Room Temperature	Warm	Room Temperature	Warm
A.	Magnesium (ribbon)	Reacts to give hydrogen	Rapid reaction	Reacts to give hydrogen	Rapid reaction
B.	Aluminium (foil)	Reacts to give hydrogen	Rapid reaction	Reacts to give hydrogen	Rapid
C.	Iron (filings)	Reacts to give hydrogen	Rapid reaction	Reacts to give hydrogen	Rapid
D.	Copper (Peeled flexible wire)	No reaction	No reaction	No reaction	No reaction
E.	Charcoal (powder)	No reaction	No reaction	No reaction	No reaction
F.	Sulphur (powder)	No reaction	No reaction	No reaction	No reaction

### V LONG ANSWER TYPE QUESTIONS (5 M):

1. Saloni took a piece of burning charcoal and collected the gas evolved in a test tube.

(a) How will she find the nature of the gas?

(b) Write down word equations of all of the reactions taking place in this process?

**[Hint- (a) When charcoal is burnt in air, carbon dioxide is formed. Add some water in the test tube in which gas is collected. Now, cover the test tube. Shake it well. Test the solution with blue litmus and red litmus. Blue litmus turns red. Thus, the nature of gas is acidic.**

**(b) Carbon + Oxygen  $\longrightarrow$  Carbon dioxide,  
Carbon dioxide + water  $\longrightarrow$  carbonic acid**

**(Charcoal is a form of carbon)**

2. Paheli bought a statue made up of copper. To her surprise, it acquired a dull green coating after a couple of months. Explain the reason.

**[Hint-When a copper statue (or copper vessel) is exposed to moist air for long, it acquires a dull green coating. The green material is a mixture of copper hydroxide and copper carbonate formed due to the reaction of copper with moist air. The following is the reaction-**

**Copper + water + carbon dioxide + oxygen  $\longrightarrow$  copper hydroxide + copper carbonate**

The green coating is commonly known as ‘basic copper carbonate’ and the formation of green coating on copper objects shows the corrosion of copper.]

3. Give any four points of difference between the physical properties of metals and non-metals.

Physical properties	Metals	Non-metals
Malleability	Malleable	Non-malleable
Ductility	Ductile	Non-ductile
Sonority	Sonorous	Non-sonorous
Conduction of electricity	Good conductor	Poor conductors(except graphite)

### **REACTIVITY SERIES-**

- The arrangement of metals in a vertical column in the order of decreasing reactivity is called the **reactivity series** of metals.
- Metals like sodium and potassium react vigorously with dilute acids.
- The metals above hydrogen in the reactivity series react with dilute acids.
- A more reactive metal displaces a less reactive metal from its salt solution.
- Metals like silver, gold, copper and platinum do not react with water or dilute acids or alkalis .Such metals are called noble metals.

Please	Potassium
Stop	Sodium
Calling	Calcium
Me	Magnesium
A	Aluminium
Zebra	Zinc
Instead	Iron
Try	Tin
Learning	Lead
How	(Hydrogen)
Copper	Copper
Saves	Silver
Gold	Gold